



# DEVELOPING & ACQUIRING 21ST CENTURY WARFIGHTING SYSTEMS

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## DOD CHALLENGES

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- Globalization
- Bringing the American military into the 21st Century
- Transforming the military forces when limited by:
  - Defense budget stressed by readiness and aging force
  - Reduced technology “half-life”
  - Acquisition process that is 80% longer than 30 years ago
- Exploiting commercial information technology





## THE SOLUTION

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# exploit commercial information technology !

- Advanced Engineering Environments
- Simulation Based Acquisition





## Advanced Engineering Environments

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Integrated systems of simulation, computing, and telecommunications technologies which enable teams of researchers, designers, manufacturers, suppliers, and customers scattered across a continent, or the globe, to develop new products and carry out new missions with unprecedented effectiveness and efficiency.





# Advanced Engineering Environments

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## Vision

Create an environment that allows organizations to innovate and manage complexity with unprecedented levels of effectiveness in terms of time, cost and labor throughout the life cycle of products and missions.

## System Capabilities

- Enable complex new systems (and systems of systems), products, and missions
- Greatly reduce product development cycle time and costs





## AEE System Components

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### Computation, Modeling, and Software

- Multidisciplinary analysis and optimization
- Interoperability of tools, data, and models
- System analysis and synthesis
- Collaborative, distributed systems
- Software structures that can easily be reconfigured
- Deterministic and nondeterministic simulation methods





## AEE System Components

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### Human-Centered Computing

- Human-adaptive interfaces
- Virtual environments
- Immersive systems
- Telepresence
- Intelligence augmentation





## AEE System Components

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### Hardware and Networks

- Ultrafast computing systems
- Large high-speed storage devices
- High-speed and intelligent networks

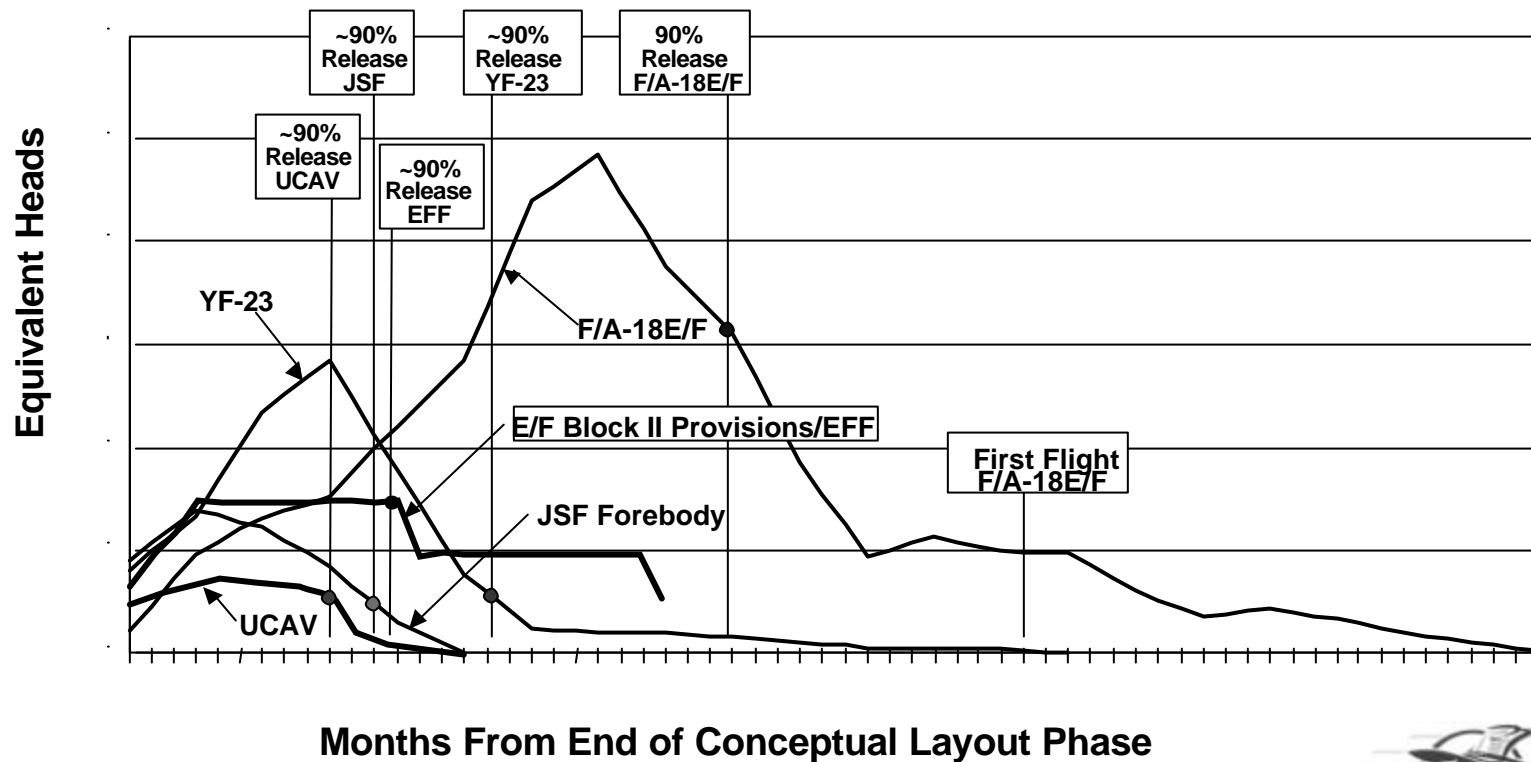






# Significant Reduction in Design Hours Realized Using Solids and Parametrics

Staffing





## Barriers to Implementing Advanced Engineering Environment

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- Integration of tools, systems, data and people
- Knowledge Management
- Organizational Culture
- Training
- Economics and Management





## Simulation Based Acquisition

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An acquisition process, enabled by the robust, collaborative use of simulation technology that is integrated across acquisition phases and programs, that is both more effective and more efficient.





# Simulation Based Acquisition

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## Vision

**Integrate simulation tools and technology across acquisition functions, program phases and across programs to improve the effectiveness and efficiency of the acquisition process.**

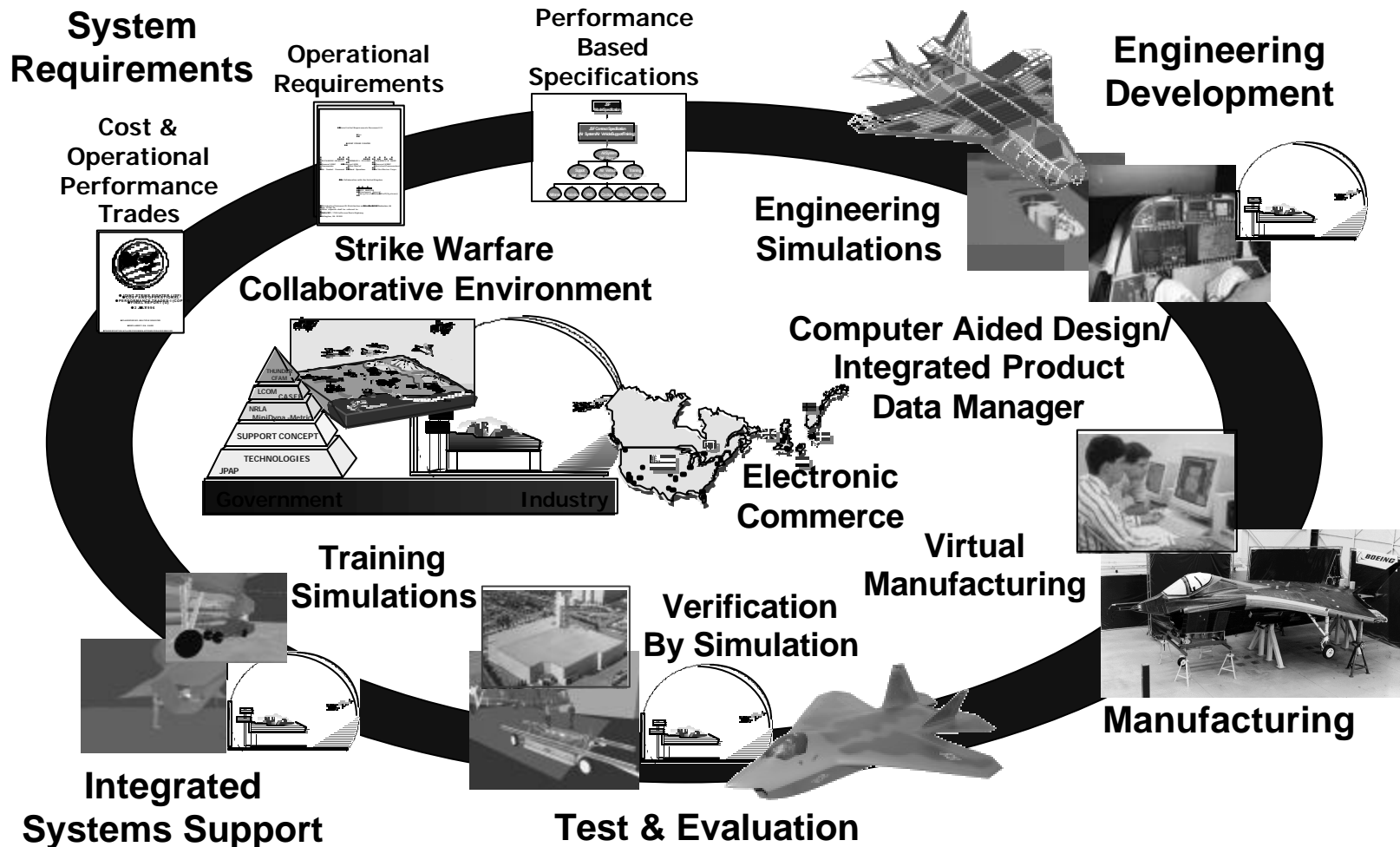
## Objectives

- **Substantially reduce the time, resources, and risk associated with the acquisition process.**
- **Increase the quality, military utility and supportability of fielded systems while reducing total ownership costs**
- **Enable Integrated Product and Process Development (IPPD) across the full acquisition life cycle**





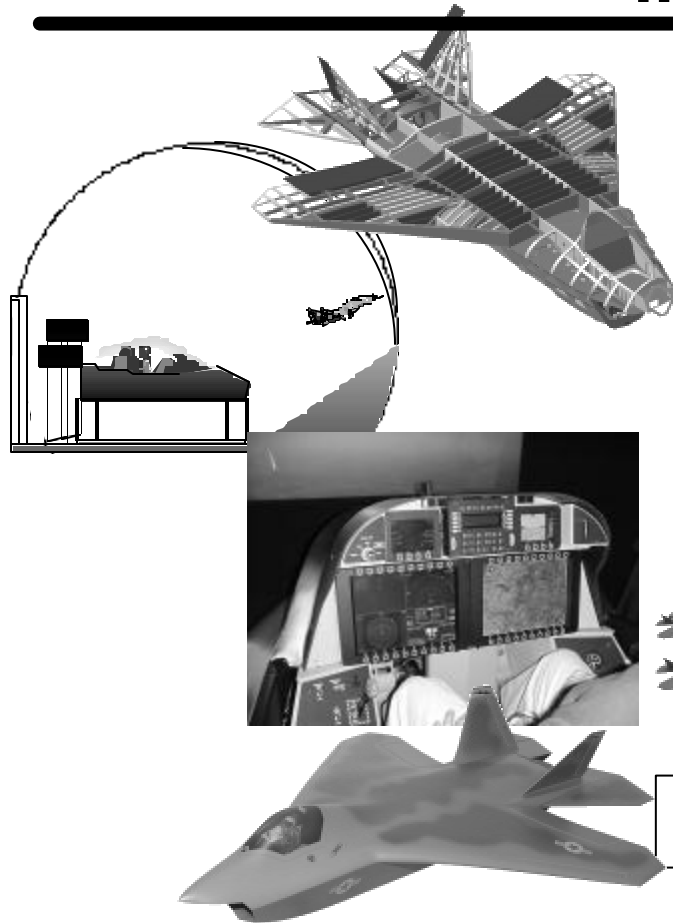
# Simulation Based Acquisition Across the Joint Strike Fighter Program



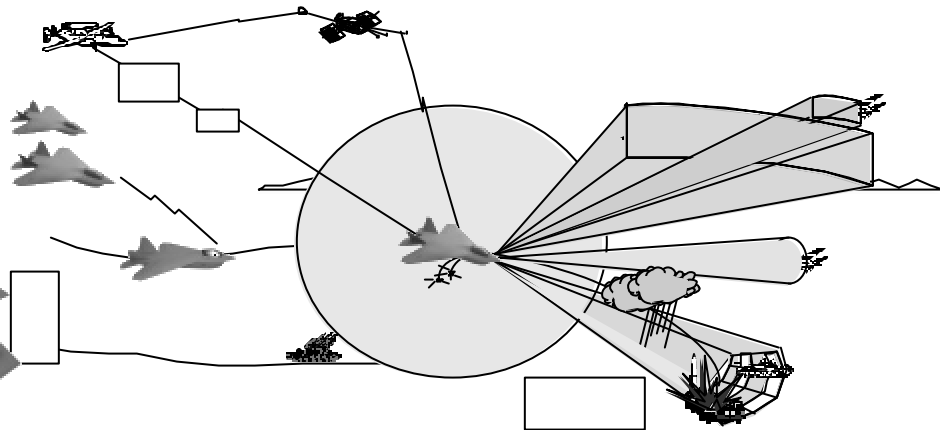


# Verification by Simulation in EMD

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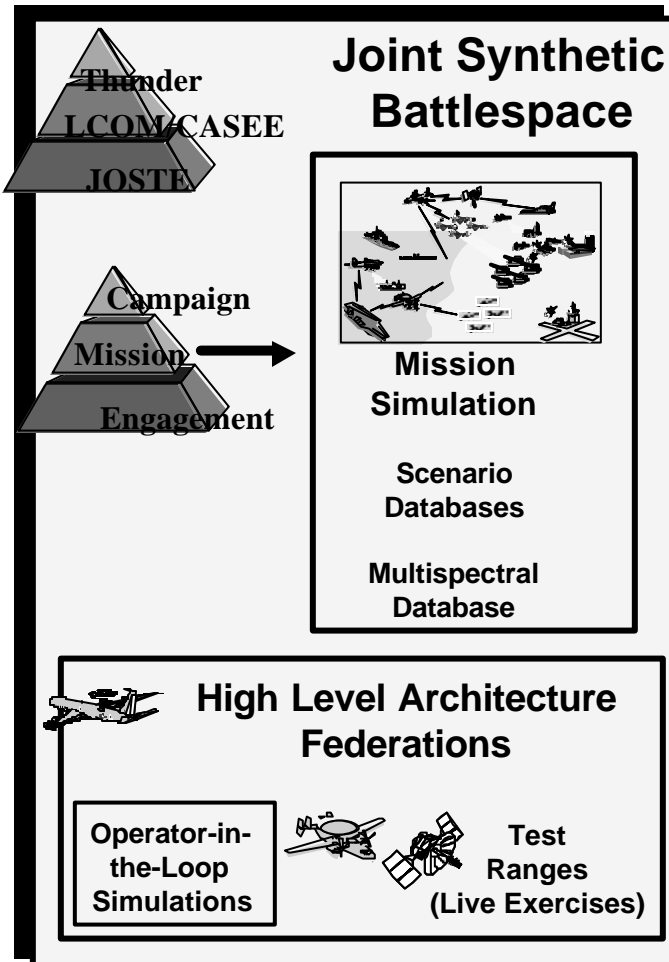


- **Simulation, Test & Evaluation Process**
  - **Simulate-Test-Simulate Iteration**
  - **Better Engineering Simulations**
- **Performance Based Specifications**
  - **Mission Effectiveness**
  - **Systems of Systems**
- **Integrated Development Test/  
Operational Test**

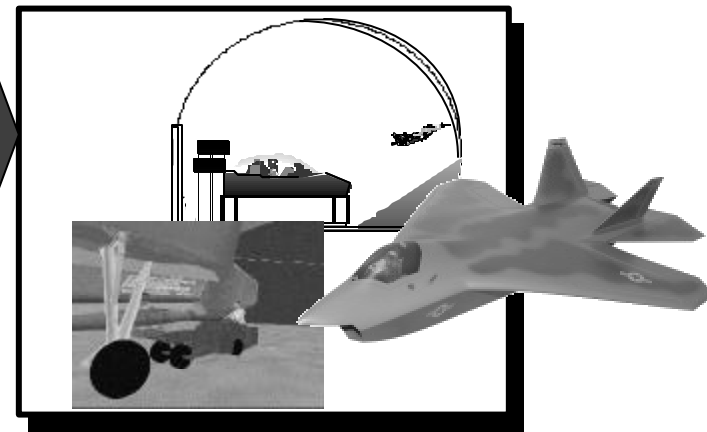




# Vision for the Future



- Basis for Enhanced Collaboration
  - Across Integrated Product Teams
  - Across Government Agencies
  - Government-Industry
- Extension to
  - CONOPS Development
  - Distributed Mission Training
  - Analysis of Commander Alternatives
  - Distributed Mission Rehearsal





## Conclusion

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Information technologies provide the opportunity to significantly reduce the time and cost of developing and acquiring 21st Century Weapon Systems.







# Questions?

